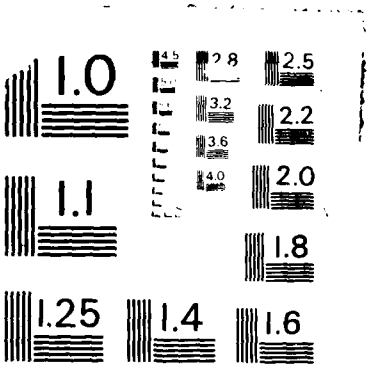
AD-A189 901 INSTRUMENTATION FOR SCIENTIFIC COMPUTING IN NEURAL NETWORKS INFORMATION S..(U) BOSTON UNIV MA CENTER FOR ADAPTIVE SYSTEMS S GROSSBERG OCT 87 AFOSR-TR-87-1966 1/1

UNCLASSIFIED AFOSR-86-0202 F/G 12/9 NL



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1a. R[illegible]	1b RESTRICTIVE MARKINGS
2a. S[illegible]	3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. D[illegible]	
4 PERFORMING ORGANIZATION R[illegible] NUMBER(S)	5 MONITORING ORGANIZATION REPORT NUMBER(S) AFOSR-TR- 87-1966
6a NAME OF PERFORMING ORGANIZATION Center for Adaptive Systems	6b OFFICE SYMBOL (If applicable)
6c ADDRESS (City, State, and ZIP Code) Boston University 111 Cummington Street, Boston, MA 02215	7a NAME OF MONITORING ORGANIZATION AFOSR/NM
	7b ADDRESS (City, State, and ZIP Code) AFOSR/NM Bldg 410 Bolling AFB DC 20332-6448
8a NAME OF FUNDING/SPONSORING ORGANIZATION AFOSR	8b OFFICE SYMBOL (If applicable) NM
8c ADDRESS (City, State, and ZIP Code) AFOSR/NM, Building 410 Bolling AFB, DC 20332-6448	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER AFOSR 86-0282
	10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO: 61102F; PROJECT NO: 2917/; TASK NO: /A5; WORK UNIT ACCESSION NO:

11 TITLE (Include Security Classification)
Instrumentation for scientific computing in neural networks, information science, artificial intelligence, and applied mathematics

12 PERSONAL AUTHOR(S)
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13a TYPE OF REPORT	13b TIME COVERED	14 DATE OF REPORT (Year, Month, Day)	15 PAGE COUNT
final	FROM 7/30/86 TO 7/29/87	October, 1987	4 pages

16 SUPPLEMENTARY NOTATION

17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

This was an instrumentation grant to purchase equipment for support of research in neural networks, information science, artificail intellignece, and applied mathematics. Computer lab equipment, motor control and robotics lab equipment, speech analysis equipment and computational vision equipment were purchased.

20 DISTRIBUTION/AVAILABILITY OF ABSTRACT	21 ABSTRACT SECURITY CLASSIFICATION
☐ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	
22a NAME OF RESPONSIBLE INDIVIDUAL Maj. Woodruff	22b TELEPHONE (Include Area Code) (202) 767-5027
	22c OFFICE SYMBOL NM

DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted
All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

FINAL PROGRESS REPORT

submitted to
The Air Force Office of Scientific Research
by
Boston University
Boston, Massachusetts 02215

Instrumentation for Scientific Computing in Neural Networks, Information Science, Artificial Intelligence, and Applied Mathematics

Contract AFOSR 86-0282

Principal Investigator: Stephen Grossberg
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October, 1987

I. COMPUTER LAB EQUIPMENT

The following items have been purchased and are currently being used:

a) Celerity computer C-1200-630 upgrade

b) 337 MB eaglet Winchester disk for the Celerity computer

c) Precision Visuals plotting software package

d) Talaris T800 laser printer

e) Talaris continuous port parallel interface and font manager software

f) 6 AT-class microcomputers for terminal emulation, simulations and document preparation

g) UNIX, TEX, DITROFF, and LASERPLOT support for the Talaris laser printer

II. MOTOR CONTROL AND ROBOTICS LAB EQUIPMENT

A. Waterloo Spatial Motion Analysis and Recording System: The Watsmart 3-D digitizing system, the Watscope A/D unit, and Kineplot software package have been delivered by Northern Digital of Waterloo, Ontario. Installation complete.

B. Data acquisition microcomputer: A Wyse 2200-40 AT-compatible microcomputer has been delivered by MTI Systems of Billerica, Massachusetts. The graphics card, monitor, and 80287 coprocessor were supplied by other vendors. Installation complete.

C. Experiment-control microcomputer: A Wyse 2200-20 AT-compatible microcomputer has been delivered by MTI Systems of Billerica, Massachusetts. Analog and digital I/O boards were supplied by MetraByte Corporation of Stoughton, Massachusetts. Installation complete.

D. EMG sensors: Cost reassessment showed that too little had been budgeted for this item, so no purchase was possible.

E. Dot-matrix printer: Delivered and installed.

F. Diskettes: Purchased in part.

G. Tripods: A wall-to-wall pipe with camera mounting brackets were used to provide better camera support than available from tripods. Installation complete.

H. Graduated weights: Not yet purchased.

I. Microcomputer software: Terminal emulation software was purchased. A Fortran 77 compiler with IMSL subroutine library has been purchased. A C compiler and interpreter with graphics extensions has been purchased (this is a substitution for the Turbo Pascal compiler with graphics extensions listed in the original budget). A C language subroutine library and a printer driver were also purchased. Installation complete.

J. Motor-control experiments: An additional grant for payment of human subjects has been secured, several experiments have been approved by the Institutional Review Board, and training of the first undergraduate research assistant has begun. the first experiments will be studies of visually-directed reaching, each study designed to test, or inform the further development of, the vector-integration-to-endpoint model of movement planning and trajectory formation (Bullock and Grossberg, 1988).

III. SPEECH ANALYSIS EQUIPMENT

A. Bruel and Kjaer: The following equipment has been purchased: 2 condensing microphones, 2 microphone preamplifiers, channel power supply for preamplifiers, sound spectrum analyzer with interfaces, and IEC/IEE adapter.

B. National Instruments: Both the device driver and the DMA IEE to Unibus converter have been purchased and delivered.

C. Wavetek noise generator: Purchased and delivered.

D. Sennheiser MD421 U5 microphone: Purchased to input to the DSC-200 (Digital Sound Corporation) workstation. This purchase was necessary because the Bruel and Kjaer condensing microphones were not properly impedance-matched to the DSC-200 workstation.

E. Crown Powerline amplifiers: Purchase of this item was not necessary in view of our prior purchase of the DSC-200 workstation.

F. Technics RS-120 dual cartridge tape recorder: This item was substituted for the TEAC 1000 machine.

G. AKG K130 headphones: This was purchased as a monitor for the DSC-200 workstation.

H. Boston Acoustics A40 speakers: One pair, purchased as output for the DSC system.

I. Full ILS (International Library of Speech): Purchased and being actively used.

The equipment purchased in this grant, along with the DSC workstation mentioned above, is being used intensively as part of a speech waveform editing and analysis package. At present we are studying both variability across speakers and within speakers in the spectra, and waveforms of vowels and consonants preliminary to the construction of a speech analysis package. The ILS software package has made possible rapid and detailed analysis of the waveforms. The spectral analyzer and associated National Instruments interface are used for rapid spectral display and analysis.

We have found it convenient to make a number of substitutions of small cost in the purchased equipment. We found that purchase of the Crown power amplifiers was unnecessary since the DSC-200 provided adequate power. We replaced the TEAC 1000 tape unit with a Technics RS-120 dual cartridge tape unit because it was both less expensive and more convenient. We also purchased a microphone (item D), a set of headphones (item G), and a pair of speakers (item H) to facilitate input and output between this equipment and the DSC workstation.

IV. COMPUTATIONAL VISION EQUIPMENT

A. A Silicon Graphics IRIS 3130 workstation has been purchased. Installation occurred in July and the system has been used extensively since, both for display of neural network simulation results and for generation and display of visual stimuli.

B. A recently introduced **Mitsubishi G-500 color thermal printer** with 240 dots-per-inch resolution was deemed to be a more appropriate solution to our hard-copy needs. Its purchase price was almost identical to the Dunn System, but its per page cost is much lower and it produced hard copies instantly, requiring no time for photographic

development. Using a Graftel VP 240 Video Processor as an interface, the G-500 operates directly off video signals, requiring no software drivers. The printer/processor system has been purchased and installed.

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